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The Effects of Path Crossover on Spatial Orientation

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Introduction

Prior research has discovered that when an individual's path has a crossover, there seems to be a significant deterioration in the individual's spatial orientation (Klatzky et al., 1990; Loomis et al., 1993). However, despite the equivocal nature of the initial discovery, the possible effect of path crossover has been largely neglected in the literature.

Can we find and therefore confirm the existence of a path crossover effect?

- If the path crossover indeed has a detrimental effect on spatial orientation, participants will return to the starting position with decreased accuracy and precision after walking along the paths with a crossover.

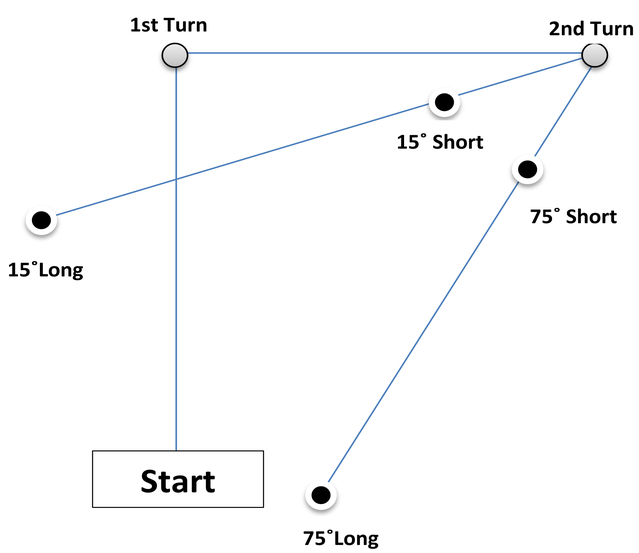
Methods

Blindfolded participants (n = 12) were guided along paths that consisted of three segments and two turns, and then asked to walk back to the starting position.

There were four configurations of the paths:

- 15˚ short and long
- 75˚ short and long

Only configuration 15˚ long contained a crossover.



Results

Constant error (mean distance between the starting point and stopping point) was larger in the 15˚ conditions.

Similarly, variable error (consistency in response) in the 15˚ short conditions was greater.

Discussion

Results showed that error is modulated mainly by turn angles, irrespective of the presence of a crossover.

- Many conditions yielded errors as large as (or even greater than) error in the 15˚ long condition (the only condition contained a crossover)
- The 15˚ short condition yielded the greatest errors (even though it did not have a crossover), suggesting that the large turn, not the crossover, disoriented participants
- Errors also increased as participants walked farther, showing that walked distance contributed to spatial disorientation

These results did not confirm the existence of the crossover effect, but instead suggest that turn angle exerts greater influence on an individual's orientation when navigating through space.

Future Directions:

- These findings need to be investigated further using a larger subject pool in order to see if this pattern of data is consistent in other subjects.
- Why and how does turn angle affect an individual's spatial orientation?

References

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